Name ______________________ Class ____________ Date ____________

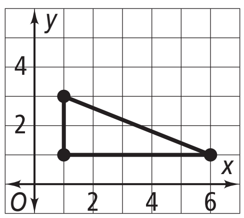
5-3 Practice

Form G

Bisectors in Triangles

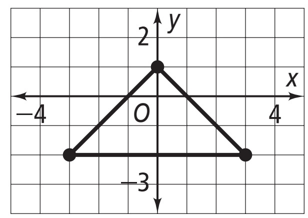
Coordinate Geometry **Find the circumcenter of each triangle.**

1.



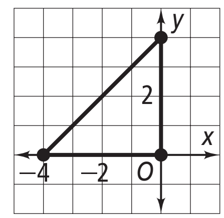
(3.5, 2)

2.



(0, −2)

3.



(−2, 2)

Coordinate Geometry **Find the circumcenter of $\triangle ABC$.**

4. $A(1, 3)$ **(2.5, 2.5)**
$B(4, 3)$
$C(4, 2)$

5. $A(2, -3)$ **(−1, −5)**
$B(-4, -3)$
$C(-4, -7)$

6. $A(-5, -2)$ **(−2, 2)**
$B(1, -2)$
$C(1, 6)$

7. $A(5, 6)$ **(2.5, 1.5)**
$B(0, 6)$
$C(0, -3)$

8. $A(1, 3)$ **(3, 2.5)**
$B(5, 3)$
$C(5, 2)$

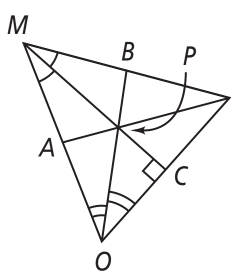
9. $A(2, -2)$ **(−1, −4.5)**
$B(-4, -2)$
$C(-4, -7)$

10. $A(-5, -3)$ **(−2, 1.5)**
$B(1, -3)$
$C(1, 6)$

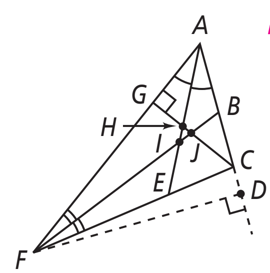
11. $A(5, 2)$ **(2, −0.5)**
$B(-1, 2)$
$C(-1, -3)$

Name the point of concurrency of the angle bisectors.

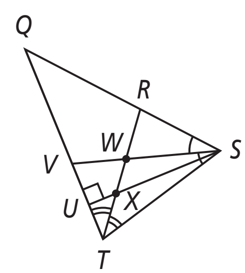
12. **P**



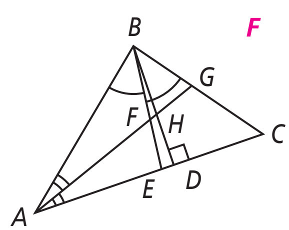
13. **I**



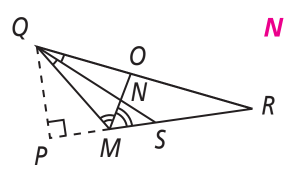
14. **W**



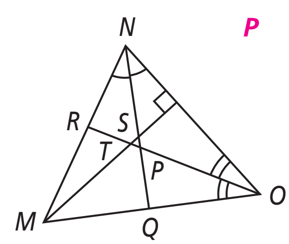
15. **F**



16. **N**



17. **P**

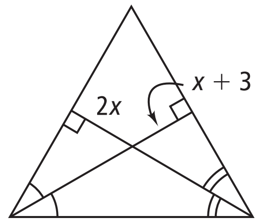


5-3 Practice (continued) *Form G*

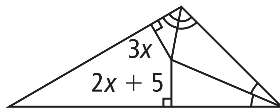
Bisectors in Triangles

Find the value of *x*.

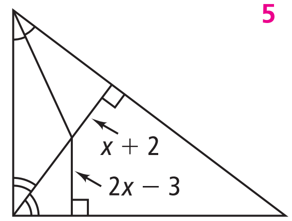
18. **3**



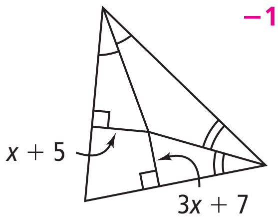
19. **5**



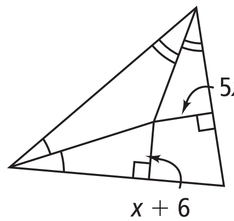
20. **5**



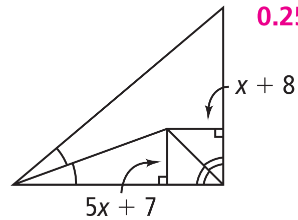
21. **−1**



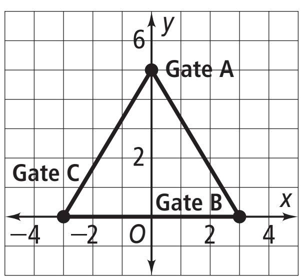
22. **2.5**



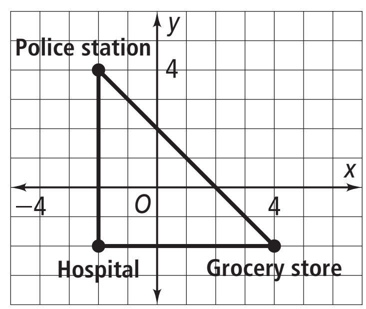
23. **0.25**



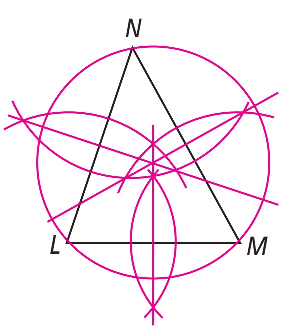
24. Where should the farmer place the hay bale so that it is equidistant from the three gates? **(0, 1.6)**



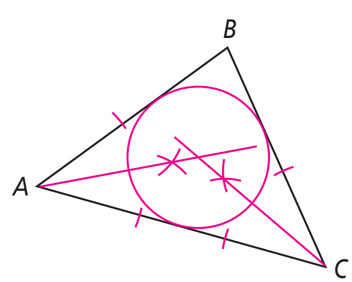
25. Where should the fire station be placed so that it is equidistant from the grocery store, the hospital, and the police station? **(1, 1)**



26. Construction Construct three perpendicular bisectors for $\triangle LMN$. Then use the point of concurrency to construct the circumscribed circle.



27. Construction Construct two angle bisectors for $\triangle ABC$. Then use the point of concurrency to construct the inscribed circle.



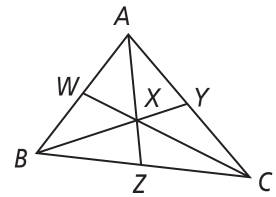
Name ______________________ Class ____________ Date ____________

5-4 Practice

Form G

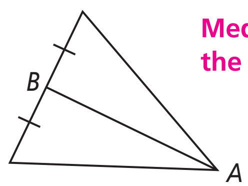
Medians and Altitudes

In △*ABC*, *X* is the centroid.

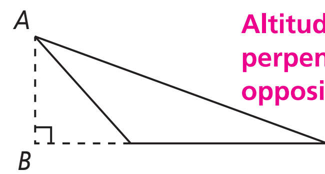


1. If $CW = 15$, find CX and XW. **$CX = 10$; $XW = 5$**
2. If $BX = 8$, find BY and XY. **$BY = 12$; $XY = 4$**
3. If $XZ = 3$, find AX and AZ. **$AX = 6$; $AZ = 9$**

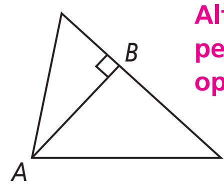
Is $\overline{AB}$ a *median*, an *altitude*, or *neither*? Explain.

4. 

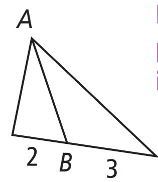
Median; $\overline{AB}$ bisects the opposite side.

5. 

Altitude; $\overline{AB}$ is perpendicular to the opposite side.

6. 

Altitude; $\overline{AB}$ is perpendicular to the opposite side.

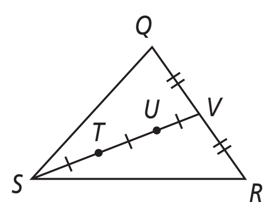
7. 

Neither; $\overline{AB}$ is not perpendicular to nor does it bisect the opposite side.

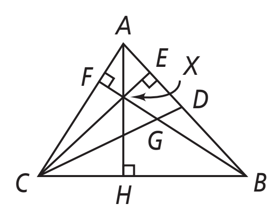
Coordinate Geometry **Find the orthocenter of △*ABC*.**

8. $A(2, 0)$, $B(2, 4)$, $C(6, 0)$ **(2, 0)**
9. $A(1, 1)$, $B(3, 4)$, $C(6, 1)$ **(3, 3)**

10. Name the centroid. ***U***

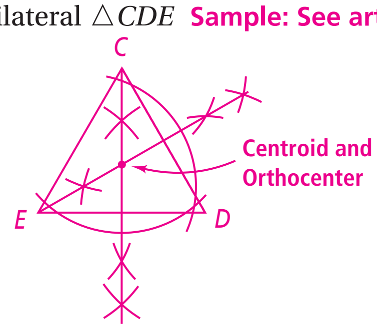


11. Name the orthocenter. ***X***

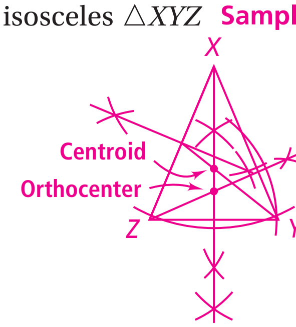


Draw a triangle that fits the given description. Then construct the centroid and the orthocenter.

12. equilateral △*CDE* **Sample: See art.**



13. acute isosceles △*XYZ* **Sample: See art.**



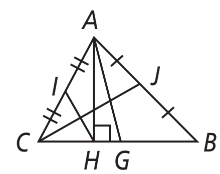
Name ______________________ Class ____________ Date ____________

5-4 Practice (continued) *Form G*

Medians and Altitudes

In Exercises 14–18, name each segment.

14. a median in $\triangle ABC$ **$\overline{CJ}$**



15. an altitude for $\triangle ABC$ **$\overline{AH}$**

16. a median in $\triangle AHC$ **$\overline{IH}$**

17. an altitude for $\triangle AHB$ **$\overline{AH}$ or $\overline{BH}$**

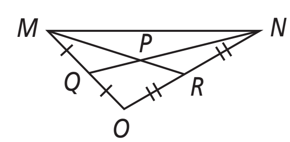
18. an altitude for $\triangle AHG$ **$\overline{AH}$ or $\overline{GH}$**

19. $A(0, 0)$, $B(0, -2)$, $C(-3, 0)$. Find the orthocenter of $\triangle ABC$. **(0, 0)**

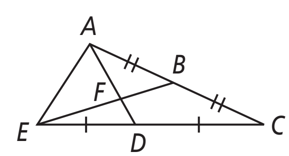
20. Cut a large isosceles triangle out of paper. Paper-fold to construct the medians and the altitudes. How are the altitude to the base and the median to the base related? **They are the same.**

21. In which kind of triangle is the centroid at the same point as the orthocenter? **equilateral**

22. P is the centroid of $\triangle MNO$. $MP = 14x + 8y$. Write expressions to represent PR and MR. **$PR = 7x + 4y$; $MR = 21x + 12y$**



23. F is the centroid of $\triangle ACE$. $AD = 15x^2 + 3y$. Write expressions to represent AF and FD. **$AF = 10x^2 + 2y$; $FD = 5x^2 + y$**



24. Use coordinate geometry to prove the following statement.

Given: $\triangle ABC$; $A(c, d)$, $B(c, e)$, $C(f, e)$

Prove: The circumcenter of $\triangle ABC$ is a point on the triangle.

Sample: The circumcenter is the intersection of the perpendicular bisectors of a triangle. The midpoints of $\overline{AB}$ and $\overline{BC}$ are $\left(c, \frac{d+e}{2}\right)$ and $\left(\frac{c+f}{2}, e\right)$. So, the equations of their perpendicular bisectors are $x = \frac{c+f}{2}$ and $y = \frac{d+e}{2}$. Their intersection is $\left(\frac{c+f}{2}, \frac{d+e}{2}\right)$, which is the midpoint of AC.